

REMARKS

In view of the following remarks, Applicant respectfully requests reconsideration and allowance of the subject application.

The current Office Action dated September 3, 2004 repeats verbatim, the arguments set forth in the previous Office Action dated May 7, 2004. Accordingly, in addition to the following remarks, Applicant incorporates the entire text of its previous "Response To Office Action Dated May 7, 2004".

Furthermore, as discussed herein below, although the current Office Action includes a "Response to Arguments" section, Applicant's previous arguments are not addressed or responded to in any meaningful way. The Office merely makes bald and unexplained/unsupported assertions that the cited references teach elements of Applicant's claims. Applicant firmly maintains that every one of the pending claims 1-22 is clearly allowable over the cited references and that the rejections of claims 1-22 have no basis.

§103 Rejections

Claims 1-22 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over US Patent No. 4,896,261 to Nolan (hereinafter, "Nolan") and further in view of US Patent No. 5,379,297 to Glover et al (hereinafter, "Glover"). Applicant respectfully traverses the rejection.

Nolan teaches a system for scheduling serial message transmissions on a bus (col. 1, lines 9-10, lines 58-60). The system in Nolan controls message transmission through the use of a message list 28. The message list 28 comprises message pointer blocks 27. The system schedules messages by altering the previous and next message pointer block addresses in various pointer blocks in the

1 message list. The message list 28 specifies the order in which messages are to be
2 transmitted by the microprocessor 17. (col. 5, lines 22-29).

3 **Claim 1** recites the following:

4 A machine-readable medium having a data structure stored
5 thereon for efficiently ordering a plurality of entities, each entity having
6 a rank within a plurality of ranks, the data structure comprising:

7 a horizontally linked list linking at least a subset of the plurality
8 of entities in at least a descending rank order direction, each entity in
9 the horizontally linked list having a unique rank as compared to the
10 ranks of other entities in the horizontally linked list; and,

11 an array having a plurality of array entries over which the
12 plurality of ranks are distributed such that each array entry has a
13 corresponding range of ranks, at least one array entry each pointing to
14 an entity of the plurality of entities having a greatest rank within the
15 corresponding range of ranks for the array entry.

16 Regarding claim 1, the Office asserts that Nolan teaches, at col. 9, lines 29-
17 40, and col. 11, lines 12-20, "an array having a plurality of array entries over
18 which the plurality of ranks are distributed such that each array entry has a
19 corresponding range of ranks, at least one array entry each pointing to an entity of
20 the plurality of entities having a greatest rank within the corresponding range of
21 ranks for the array entry".

22 However, referring to Nolan at Figs. 1 and 2, it can more clearly be seen
23 that Nolan actually teaches a message list 28 having message pointer blocks 27
24 associated with messages 21 that are destined for serial transmission on a single
25 bus 11. The message pointer blocks 27 each include a start and end memory
address for an associated message, in addition to the memory address of the
pointer block associated with the next message scheduled to be sent over the bus.
Both the messages 21 and the message list 28 are stored in a memory 21 and 22,
respectively, which can be the same memory. However, neither the messages 21

1 nor the message list 28 amounts to "an array having a plurality of array entries
2 over which the plurality of ranks are distributed such that each array entry has a
3 corresponding range of ranks, at least one array entry each pointing to an entity of
4 the plurality of entities having a greatest rank within the corresponding range of
5 ranks for the array entry", as in Applicant's claim 1.

6 From Fig. 2 of Nolan, it can be seen that a message list 28 includes
7 message pointer blocks 27. Each message block 27 refers to a single message 21.
8 (Fig. 2; col. 5, lines 10-30). By way of an attempted analogy to claim 1, if the
9 message list 28 is considered to be an "array", and each message block 27 is
10 considered to be one of the "array entries", then it is clear that each array entry
11 does not have a "corresponding range of ranks", which is an element of claim 1.
12 Rather, each array entry (i.e., each message block 27) points to one, and only one,
13 message 21. Claim 1 recites that "each array entry has a corresponding range of
14 ranks". At a minimum, therefore, each message block 27 in Nolan would have to
15 at least point to a *range* of messages 21 in order to be considered even similar to
16 claim 1 with respect to "each array entry has a corresponding range of ranks".
17 However, as noted above, each message block 27 in Nolan does not point to a
18 range of messages 21. Rather, each message block 27 points only to a single
19 message 21. Accordingly, Nolan cannot fairly be said to teach that "each array
20 entry has a corresponding range of ranks".

21 Furthermore, other than the message list 28 and message pointer blocks 27,
22 there are no other structures or descriptions in Nolan that could be considered to
23 be analogous to the "array" and "array entries" recited in claim 1. Therefore,
24 Applicant respectfully submits that there is nothing in Nolan that teaches "an array
25 having a plurality of array entries over which the plurality of ranks are distributed

1 such that each array entry has a corresponding range of ranks, at least one array
2 entry each pointing to an entity of the plurality of entities having a greatest rank
3 within the corresponding range of ranks for the array entry", as recited in
4 Applicant's claim 1. Accordingly, the 35 U.S.C. §103(a) rejection of claim 1 is
5 not supported, and Applicant respectfully requests that it be removed.

6 The Office next refers to Glover for support. Regarding claim 1, the Office
7 cites Glover only for its purported discussion of a "horizontally linked list", and
8 not for any teaching or suggestion of an array or array entries as discussed above.
9 Furthermore, Applicant cannot find any such teaching or suggestion in Glover
10 regarding an array or array entries as discussed above regarding claim 1.
11 Accordingly, Glover does not remedy the deficiencies of Nolan noted above, and
12 claim 1 is allowable over the combination of these two references.

13 Further regarding claim 1, the Office admits that Nolan does not teach the
14 use of a horizontally linked list. However, the Office asserts that Glover (at Fig.
15 12; col. 6, lines 57-67; col. 49, line 59 - col. 50, line 13) teaches "a horizontally
16 linked list linking at least a subset of the plurality of entities in at least a
17 descending rank order direction, each entity in the horizontally linked list having a
18 unique rank as compared to the ranks of other entities in the horizontally linked
19 list" as recited in Applicant's claim 1.

20 Glover teaches a communication unit for concurrently processing cells in
21 an asynchronous transfer mode (ATM) network. Packets that are to be transmitted
22 are segmented into a plurality of cells, concurrently, for a plurality of channels for
23 transmission over the (ATM) network. Cells received from the ATM network are
24 reassembled concurrently for the plurality of channels. A pipelined segmentation
25 unit includes a pipelined segmentation processor, control memory, and data

1 memory where the segmentation unit receives the packet inputs for two or more
2 channels and provides ATM cell outputs concurrently for the two or more
3 channels. A pipelined reassembly unit includes a pipelined reassembly processor,
4 control memory, and data memory where the reassembly unit receives the ATM
5 cell inputs for the two or more channels and provides packet outputs concurrently
6 for the two or more channels. (col. 6, lines 23-45).

7 The control memory stores two-dimensional queues (rate queues, channel
8 queues) of descriptors. Each descriptor identifies a single packet to be transmitted,
9 and stores information about the single packet for use in segmentation or
10 reassembly. Each of a plurality of rate queues is associated with one transmission
11 rate. Each rate queue is a linked list of descriptors where each descriptor in the
12 rate queue identifies a packet from a different channel having cells to be
13 transmitted at the rate for the particular rate queue. A plurality of channel queues
14 is provided, one for each channel having a descriptor in a rate queue. Each
15 channel queue is a linked list of descriptors where each descriptor identifies a
16 packet to be transmitted. A linked list of descriptors for a channel queue identifies
17 all the packets to be transmitted on a single channel associated with that channel
18 queue. (col. 6, line 46 - col. 7, line 6).

19 Fig. 12 of Glover illustrates rate queues and channel queues created in the
20 control memory. Rate queues appear in the vertical direction while channel
21 queues appear in the horizontal direction. Each rectangle in Fig. 12 represents a
22 packet identified by a descriptor in the left portion of the rectangle. Each rate
23 queue includes descriptors for packets that are to be transferred over the ATM
24 network at the same transmission rate. Each channel queue includes descriptors
25

1 for packets that are to be transferred over the ATM network over the same
2 channel. (col. 49, line 48 - col. 50, line 25).

3 It is clear from the above description of Glover regarding Fig. 12 (Figs. 12-
4 1, 12-2, 12-3, 12-4), for example, at cols. 49 and 50, that a channel queue (i.e., a
5 horizontally linked channel list) includes descriptors that *identify* packets to be
6 transmitted over one, single channel. The channel queue simply identifies and
7 associates those packets to be transmitted over the same channel. A channel queue
8 does not link entities (i.e., packets) in a *descending rank order*. A channel queue
9 does not link entities in any *rank order* at all. There is no rank order associated
10 with the packets that are linked together in Glover's channel queues. Rather,
11 Glover's channel queues merely identify which packets are to be transmitted over
12 a particular channel.

13 Thus, Applicant respectfully submits that Glover does not teach "a
14 horizontally linked list linking at least a subset of the plurality of entities in at least
15 a descending rank order direction, each entity in the horizontally linked list having
16 a unique rank as compared to the ranks of other entities in the horizontally linked
17 list", as recited in Applicant's claim 1. Accordingly, for these additional reasons,
18 Applicant respectfully submits that the 35 U.S.C. §103(a) rejection of claim 1 is
19 not supported, and requests that the rejection be removed.

20 Claims 2-9 depend from claim 1 and therefore include the elements of
21 claim 1. Therefore, claims 2-9 are allowable at least on the basis of this
22 dependency, in addition to the further elements recited therein which are neither
23 shown nor suggested by the cited references. Accordingly, Applicant respectfully
24 requests that the 35 U.S.C. §103(a) rejection to claims 2-9 be removed.
25

1 Regarding independent claim 10, the Office asserts that Nolan teaches (at
2 col. 9, lines 29-40, and col. 11, lines 12-20) the following from Applicant's claim
3 10:

4 A method for removing a particular entity from a plurality of
5 entities, each entity having a rank within a plurality of ranks, the
6 method comprising:

7 in response to determining that the particular entity is present
8 within a vertically linked list linking in at least one direction a
9 corresponding subset of the plurality of entities having an identical
10 rank, the corresponding subset including the particular entity

11 However, as noted above regarding claim 1, Nolan teaches message blocks
12 that each point only to a single message 21. Each message block does not point
13 to a range (or *plurality*) of messages 21. Thus, it cannot fairly be said that Nolan
14 teaches "each entity having a rank within a *plurality* of ranks", as is recited in
15 Applicant's claim 10. Therefore, Applicant respectfully submits that the cited
16 references do not support a *prima facie* case of obviousness, and that the rejection
17 to claim 10 should be removed.

18 Furthermore, regarding claim 10, neither of the cited references teaches "in
19 response to determining that the particular entity is present within a vertically
20 linked list . . .". Neither Nolan nor Glover discuss such "determining" as recited
21 in claim 10. For this additional reason, the rejection of claim 10 is not supported,
22 and Applicant respectfully requests that it be removed.

23 Further regarding claim 10, the Office admits that Nolan does not teach the
24 use of a horizontally/vertically linked list, but refers to Glover and asserts that
25 Glover teaches the following:

26 A method of determining that the particular entity is present
27 within a horizontally linked list linking at least a subset of the plurality

1 of entities in at least in a descending rank order direction, the subset
2 including the particular entity

3 However, as noted above regarding claim 1, Glover does not teach "a
4 horizontally linked list linking at least a subset of the plurality of entities in at least
5 in a descending rank order". Packets linked together in Glover's channel queues
6 do not provide a rank order at all. Rather, Glover's channel queues merely
7 identify which packets are to be transmitted over a particular channel.

8 For this additional reason, Applicant respectfully submits that the cited
9 references do not support a *prima facie* case of obviousness with respect to claim
10, and that the rejection to claim 10 should therefore be removed.

11 Claims 11-18 depend from claim 10 and therefore include the elements of
12 claim 10. Therefore, claims 11-18 are allowable at least on the basis of this
13 dependency, in addition to the further elements recited therein which are neither
14 shown nor suggested by the cited references. Accordingly, Applicant respectfully
15 requests that the 35 U.S.C. §103(a) rejection to claims 11-18 be removed.

16 Regarding independent **claim 19**, the Office asserts that Nolan teaches
17 various elements of claim 19, including the following, for example:

18 A method for adding a new entity having a rank within a
19 plurality of ranks to a plurality of entities also each having a rank within
the plurality of ranks, the method comprising:

20 of a plurality of array entries of an array over which the plurality
21 of ranks are distributed such that each array entry has a corresponding
range of ranks, determining the array entry having the corresponding
range of ranks in which the rank of the new entity lies;

22 adjusting the array entry having the corresponding range of ranks
23 into which the rank of the new entity lies to point to the new entity in
response to determining that the array entry currently points to null

1 However, it is apparent that at least some of these elements of claim 19 are
2 similar to or the same as elements already discussed above regarding claims 1 and
3 10 with reference to Nolan. Accordingly, the same discussion above regarding the
4 rejection of claims 1 and 10 applies equally to the rejection of claim 19. Applicant
5 therefore respectfully submits that the cited references do not support the
6 obviousness rejection to claim 19, and that the rejection should therefore be
7 removed.

8 Furthermore, regarding claim 19, the Office asserts that Glover teaches
9 various elements of claim 19, including the following, for example:

10 A method of linking the new entity into a vertically linked list
11 linking in at least one direction a corresponding subset of the plurality
12 of entities having an identical rank, in response to determining that the
13 rank of the new entity is equal to the rank of any other entity within the
14 plurality of entities; and,

15 otherwise, linking the new entity into a horizontally linked list
16 linking at least a subset of the plurality of entities in at least a
17 descending rank order direction, each entity in the horizontally linked
18 list having a unique rank as compared to the ranks of other entities in
19 the horizontally linked list.

20 However, it is apparent that at least some of these elements of claim 19 are
21 similar to or the same as elements already discussed above regarding claims 1 and
22 10 with reference to Glover. Accordingly, the same discussion above regarding
23 the rejection of claims 1 and 10 applies equally to the rejection of claim 19.
Applicant therefore respectfully submits that the cited references do not support
the obviousness rejection to claim 19, and that the rejection should therefore be
removed.

24 Claims 20-22 depend from claim 19 and therefore include the elements of
25 claim 19. Therefore, claims 20-22 are allowable at least on the basis of this

1 dependency, in addition to the further elements recited therein which are neither
2 shown nor suggested by the cited references. Accordingly, Applicant respectfully
3 requests that the 35 U.S.C. §103(a) rejection to claims 20-22 be removed.

4

5 **Response to Arguments**

6 In its Response to Arguments section of the current Office Action, the
7 Office indicates that Applicant's previous arguments filed on May 7, 2004,
8 regarding claims 1-22 have been fully considered but that they are not persuasive.
9 However, as noted above, the Office does not address or respond to Applicant's
10 arguments in any meaningful way at all.

11 For example, and more specifically, regarding Applicant's arguments that
12 Nolan does not teach,

13 "an array having a plurality of array entries over which the
14 plurality of ranks are distributed such that each array entry has a
15 corresponding range of ranks, at least one array entry each pointing to
16 an entity of the plurality of entities having a greatest rank within the
17 corresponding range of ranks for the array entry", or

18 "each entity having a rank within a plurality of ranks",

19 the Office merely asserts at page 10 of the Office Action that,

20 "an array is define[d] as a list of data values. Nolan teaches that
21 each message list memory (Fig. 2, element 28) has different messages
22 (Fig. 2, element 27) and each message has different priority (Fig. 2,
23 element PRI). Each pointer (Fig. 2 element 24, 25) points to a message
24 within the message memory list (col. 2 lines 22-45, col. 11 lines 12-
25 20)."

1 However, Applicant's arguments have already addressed Nolan with
2 respect to these passages and Fig. 2, and clearly show that Nolan does not teach
3 the elements of Applicant's claims.

4 Nolan teaches scheduling of message transmission through the use of a
5 message list 28 that specifies an order in which messages are to be sent. There is a
6 message pointer block 27 for every *single* message. Each message pointer block
7 27 includes a start and end memory address for *one* associated message. The
8 messages are stored in a memory 21. Each message pointer block 27 also includes
9 the memory address of *another* message pointer block 27 that is associated with
10 the *next* single message scheduled to be sent.

11 Each message pointer block 27 in Nolan points to *one*, and only *one*,
12 message 21. By contrast, Applicant's claim recites that "each array entry has a
13 corresponding range of ranks". At a minimum, therefore, each message block 27
14 in Nolan would have to at least point to a *range* of messages 21 in order to be
15 considered even remotely similar to Applicant's claim regarding "each array entry
16 has a corresponding range of ranks". However, as noted above, each message
17 block 27 in Nolan does *not* point to a *range* of messages 21. Rather, each
18 message block 27 points only to a *single* message 21.

19 Furthermore, the Office points to nothing in Nolan or anywhere else, that
20 teaches or suggests various elements of Applicant's claims. For example, the
21 Office points to nothing in Nolan that teaches or suggests any of the following
22 from Applicant's claim 1:

23 - a structure for efficiently ordering a plurality of entities;
24 - each entity having a rank within a plurality of ranks;

- a horizontally linked list linking at least a subset of the plurality of entities in at least a descending rank order direction;
- each entity in the horizontally linked list having a unique rank as compared to the ranks of other entities in the horizontally linked list;
- an array having a plurality of array entries over which the plurality of ranks are distributed such that each array entry has a corresponding range of ranks;
- at least one array entry each pointing to an entity of the plurality of entities having a greatest rank within the corresponding range of ranks for the array entry.

The Office states Nolan teaches that "each message has different priority (Fig 2, element PRI). However, Nolan actually states that "each pointer block 27 associated with a message includes a priority byte (PRI) associated with that message" (col. 5, lines 17-20). Nolan does not say that each message has a *different* priority, nor does Nolan teach or suggest that the "priority byte" ranks entities within a plurality of ranks, or that the "priority byte" links entities in at least a descending rank order direction, etc. Rather, Nolan uses the "priority byte" as a means of comparing the priority of a new message with the priority of other messages awaiting transmission (col. 9, lines 34-40). Again, however, there is nothing in Nolan indicating that entities are ranked within a plurality of ranks, or that Nolan links entities in at least a descending rank order direction, etc., as generally recited in Applicant's claims.

Regarding Applicant's arguments that Glover fails to teach,

"a horizontally linked list linking at least a subset of the plurality of entities in at least a descending rank order direction, each entity in the horizontally linked list having a unique rank as compared to the ranks of other entities in the horizontally linked list",

1 the Office asserts at page 10 of the Office Action that,

2
3 "Glover teaches both a horizontally and vertically linked list
4 (Fig. 12-1, col. 49 line 59 - col. 50 line 13, col. 6 lines 57-67). Further
5 Glover teaches the use of priority (col. 57 lines 25-33, col. 13 lines 20-
6 26)."

7
8 In Glover, packets to be transmitted over a network are segmented into
9 cells for a plurality of channels. Received cells are then reassembled for the
10 channels. A control memory stores two-dimensional queues (rate queues, channel
11 queues) of descriptors. Fig. 12 of Glover illustrates rate queues and channel
12 queues created in the control memory.

13
14 Each channel queue (i.e., a horizontally linked channel list) includes
15 descriptors that *identify* packets to be transmitted over one, single channel. The
16 channel queue simply identifies and associates those packets to be transmitted
17 over the same channel. A channel queue does not *link* entities (i.e., packets) in a
18 *descending rank order*. A channel queue does not link entities in any *rank order*
19 at all. There is no rank order associated with the packets that are linked together
20 in Glover's channel queues. Rather, Glover's channel queues merely identify
21 which packets are to be transmitted over a particular channel.

22
23 The Office states that "Glover teaches the use of priority (col. 57 lines 25-
24 33, col. 13 lines 20-26)", in an apparent attempt to assert that Glover teaches "each
25 entity in the horizontally linked list having a unique rank as compared to the ranks
of other entities in the horizontally linked list". However, there is nothing explicit
or implicit in Glover that indicates that Glover's "priority" has anything at all to
do with ranking entities uniquely in a horizontally linked list. In fact, Glover's
"priority" has to do with a "selector" granting priority to; 1) cells which appear on

1 a bus 18-01, or 2) to a congestion control information in a reverse queue that must
2 be returned in connection with a virtual channel (col. 13, lines 9-20; col. 57, lines
3 25-29). Glover's "priority" has nothing to do with ranking entities uniquely in a
4 horizontally linked list. Therefore, among other things, Glover does not teach or
5 suggest "a horizontally linked list . . . each entity in the horizontally linked list
6 having a unique rank as compared to the ranks of other entities in the horizontally
7 linked list".

8

9 **Conclusion**

10 All pending claims, 1-22, are believed to be in condition for allowance.
11 Applicant respectfully requests reconsideration and prompt issuance of the present
12 application. Should any issue remain that prevents immediate issuance of the
13 application, the Examiner is encouraged to contact the undersigned attorney to
14 discuss the unresolved issue.

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18 Respectfully Submitted,

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21 Dated: 11/03/04

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